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## ORIGINAL ARTICLES.

### ABDUCENS PALSY FOLLOWING NASAL TRAUMA AND NASAL INFECTION.*

By A. E. Ewing, M.D., and Greenfield Sluder, M.D.,

ST. LOUIS, MO.

Dr. Ewing.—A case presenting direct evidence that nasal disturbance may influence the muscles of the eye was referred to me by Dr. Sluder, December 16th, 1913. One hour previous he had injected the sphenopalatine ganglion of the right side with alcohol and carbolic acid to relieve a severe ganglion neuralgia. Immediately there was loss of motion outward in the right eye and a slight flushing of the conjunctiva. Vision in the eye was found to be normal; there was no intraocular disturbance, and the action of the extrinsic muscles was normal except that of the external rectus. In this muscle there was marked paresis, the eye moving very little beyond the median line. The patient was an intelligent trained nurse, and as she fully comprehended the situation, time alone was relied upon to work the cure, which was not fully effected until three months had passed, although there was considerable improvement at the end of four weeks, and at the close of the eighth week the action of the muscle was practically normal, and completely so in twelve weeks.

Palsies of the ocular muscles in connection with basilar injuries and gunshot wounds are not uncommon, but this is the first positive instance of an abducens paralysis produced by a small, localized, direct nasal injury that has come under my ob-

*Read before the Ophthalmic Section of the St. Louis Medical Society, December 2, 1914.

servation; and as it is a positive evidence of the intimate relation of this region to the oculomotor nerve supply, it is a point in clearing up the question of the dependence of oculomotor palsies on postethmoidal and sphenoidal sinus inflammation.

Acting on the information obtained in this case of trauma, two recent cases of spontaneous abducens palsy have been referred to Dr. Sluder for nasal examination and treatment. The first case occurred in the right eye of a young woman twenty-two years of age, who a week previous to the examination noticed that everything appeared double. At the time of the first examination, October 2nd, the vision in the right eye varied from 20/38 to 20/24, and in the left it was 20/20. In the right eye the vision could be improved to 20/20 by a weak concave lens. The muscular disturbance consisted of a slight nystagmus when looking strongly upward or downward. On the 6th there was positive restriction in the motion of the right eye outward and a diplopia which was corrected by a prism of 25 degrees base outward over the right eye; left, 20/24; fields normal; each fundus normal. The nasal examination, made the same day, revealed marked suppuration from the right sphenoidal sinus. Two days later this sinus was opened. On the 26th the recovery had so far progressed that the diplopia was corrected by a prism of 7 degrees base outward O.D.; the vision had risen to 20/20+, and was the same with +0.37 sph. Three weeks later binocular vision had become re-established and the eyes were used freely and comfortably, the vision in each eye being 20/20+.

This case is of especial interest because of the diplopia that was at first indefinite, the lowering of the vision in the right eye, the accommodative spasm and the nystagmus in extreme upward and downward exertion, all of which combined was an evidence of a general slight oculomotor and optic nerve toxemic involvement. Later the abducens became most affected, probably by reason of gravity of the toxic substance and because of proximity to the infected region, the abducens being the lowest of the oculomotor nerves in their passage through the sphenoidal fissure, and nearest to the postethmoidal and sphenoidal sinuses, as well as nearest to the sphenoidal sinus in its course over the clivus and around the posterior clinoid process of the sphenoid after its exit from the dura mater.

In addition to the actual lesson taught in this instance, there is another presumable one, which is, that many of the hysterical amblyopias, and many of the temporary indefinite muscular

anomalies and obscure disturbances of the accommodation ordinarily accredited to hysteria, may really be toxemias due to nasal infection.

The second case, a boy of six years, came November 7th, 1914, with a complete paralysis of the abducens of the left eye, the history being that the crossing had been observed by the mother for about ten days. In order to exclude the possibility of other nerve or brain involvements the patient was referred to Dr. Bliss for a neurological examination, which proved to be negative. The patient was then placed in charge of Dr. Sluder, who discovered a marked inflammation in the left sphenoidal sinus. Following a period of four days of tentative treatment there was positive motion of the eye outward; on the fourteenth the rotation outward was 45 degrees, and December 1st the rotation outward was normal, although the muscle is still weak and the patient is not able to hold the eye in position to obtain binocular vision for any length of time.

In each eye vision was normal when first seen and the ophthalmoscope has shown no evidence of intraocular disturbance. The youth of this patient, together with the time that had elapsed before he was seen, precluded the observations that were made in the case just preceding.

In both cases reliance has been placed in the local treatment as in the case of trauma first mentioned.

DR. SLUDER.—Case I.—Trained nurse, 28 years old, had previously been in Dr. Ewing's charge for an asthenopia dependent on a moderate grade of hypermetropia. Her entire ocular mechanism was known to be normal otherwise. I injected the sphenopalatine or nasal ganglion because of severe ganglion neuralgia, a procedure which I described in detail in *Trans. Section of Laryngology, Otol., A. M. A.*, 1913. The operation was performed with a straight needle inserted ½ cm. deep under the posterior tip of the middle turbinate and 0.5 c.cm. 5 per cent. phenol in 95 per cent. ethyl alcohol was instilled. Having made this injection many times I was familiar with not only the locality but the degree of tension in the tissues found here. I at once realized that the solution had flown unusually easily into the tissues of this case. Instantly she complained that "something had happened to her eye which had not happened when the ganglion of the opposite side was injected." Her eye was turned in. Dr. Ewing has given the other details.

In this case the tissues of the pterygo-maxillary fossa were unusually loose and permitted the solution to flow very easily upward and outward into the sphenoidal fissure. Lowermost in the fissure is the ophthalmic vein and then (laterally) comes the abducens which was instantly paralyzed. The course of the alcohol was outside the paranasal sinuses. These cells, however, extend to this district as soon as they are prolonged laterally into the great wing of the sphenoid, and we believe that when this is true a paralysis of the sixth (or the third or the fourth) may be brought about here by ready extension of inflammation (or its toxins) from within the sinus. The anatomical specimen submitted to you to-night shows such a sinus with the intimate association of the 6th (3rd and 4th also) nerve. Should the palsy be produced by the toxins rather than the inflammation proper, I believe the recovery is much more apt to be quicker than slower. As soon as the cavity is drained, convalescence may be expected. This is the probable explanation of Case II, which recovered so rapidly after the Hajek radical postethmoidal-sphenoidal operation; and I have seen this in other like cases, which had, however, other complications. In this case there was abundant pus. Dr. Ewing's explanation of the nystagmus by a general poisoning of the ocular nerve supply is very interesting to me, and I agree with him that a transitory amblyopia and indefinite muscle disturbances may be explained in this way. Should the lesion of the 6th trunk be on the clivus of Blumenbach where it runs for some distance in the dura mater, I do not believe it would be apt to recover so quickly because the anatomical conditions there seem less favorable than in the sphenoidal fissure, where the contact with the sinus is very short, almost at a point only, and the trunk is free in loose connective tissue.

Case III presented features of difference from Case II. It may have shown pus at some time before it came under observation but suppuration was surely not a marked characteristic. When I saw it first it showed much inflammation and a discharge of a thin mucous nature with very little or no purulent attributes. Operation was deferred for a few days in order to see what tentative treatment would accomplish, because I had learned that this would sometimes succeed admirably in such a case, and furthermore that operation sometimes failed totally. I know that the tissue removed from the anterior and lower faces of the body of the sphenoid in such cases shows a hyperplastic bone change (hyperplastic sphenoiditis). This diagnosis was made by Dr.

Jonathan Wright from my slides of similar material removed from this region. If this then be admitted as the lesion in Case III, the palsy may be explained by the trunk being caught by a periostitis in the sphenoidal fissure when the sinus approaches it in the above cited way, or, the inflammatory process may have extended through to make a neuritis. The former might readily be the source of a permanent paralysis; the latter of a slowly recovering paralysis. I believe hyperplastic sphenoiditis simple and combined with acute inflammations to be the explanation of not only such a case as III, but many of the disorders of the optic nerve, and many of the migrains, many of the differences being explained by the fact that some of the nerve trunks pass through rigid bony confines and others through soft parts only.

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## FRAGILITAS OSSIUM.

Fragilitas ossium is the subject of a paper by Maurice Ostheimer (*Jour. Am. Med. Assn.*, December 5, 1914), in which the subject is reviewed and a case report given. Ostheimer has rigorously excluded symptomatic cases (with three fractures or less) for which any cause could be discovered. The subject of fragilatis ossium is of interest to the ophthalmologist because of the occasional association of this disease with blue sclerotics. In the case reported by Ostheimer the patient was apparently well developed and fairly well nourished. No craniotabes; both von Pirquet and Wassermann reactions were negative. Both scleræ were deep blue in color. Between the ages of one and a half and four years she had had nine fractures. Ostheimer has collected from the literature to date 193 cases. In 32 cases the patients were not disabled, and of these the presence of dark blue scleræ was noted in six. The association of dark blue scleræ with brittle bones has been commented on by Stephenson, Harman, Burrows, Rolleston, Conlon and Cockayne.

Achondroplasia, rickets and osteomalacia must be differentiated from fragilatis ossium. The prognosis is usually unfavorable. The author concludes with the statement that as the ætiology remains undiscovered, no beneficial method of treatment has as yet been found. Undoubtedly the condition is congenital; it would seem probable therefore that some fault of metabolism in the pregnant woman is the cause of fragilatis ossium in her offspring.

# TRANSLATIONS.

## HYPOPHYSIS TUMORS AND MEDICAMENTOUS AND ORGAN THERAPY.*

By Eugen Wehrli,

FRAUENFELD.

(Translated by A. Alt, M.D.)

The technique of the operation of hypophysis tumors has of late made important progress. Whilst the oldest method, the transcranial, from the forehead or the temple, was followed by death in from 50 to 70 per cent., the new Schlosser-Kocher method by elevating the nose according to von Eiselsberg[1] in 33 per cent., the method of Hirsch[2] by the endonasal route (interseptal or ethmoidal), has shown only 11 per cent. of mortality, to which we must add another 11 per cent. which were not improved. The very newest method described by von Szily in the February number of this Journal, according to which two cases have been operated on in the Freiburg clinic with remarkable success, the paranasal by Chiari-Kahler, seems to be a further progress in the technique of this operation and to be of less danger, if the results prove equally good in larger series. In spite of this, it would certainly be commendable, if even a small group of selected cases only could be shown to give in to another less dangerous and less aggressive method with better effect. A case in which an operation was refused and in which with organ therapy and small quantities of iodide of potassium a great improvement was produced, seems to promise that such a procedure may be found.

This paper must not be looked upon as supporting a tendency inimical to operations; it contains a request to my practicing colleagues to try in appropriate cases the therapy, proposed by me, before operating. This will show whether mine was an exceptional case and whether actually, as it is theoretically to be expected with certainty, a certain group of hypophysis cases are cured more readily by internal treatment than by operation.

*Klin. Mtsbl. f. Augenhlk., Vol. LII, p. 653.

Mrs. A., 38 years old, married since 1901, consulted me first on May 6th, 1911, especially on account of marked loss of vision during the preceding 6 months. She complained of frequent and severe headaches, tired feeling and abhorrence of any labor.

One year after her marriage her menses disappeared; since then her former lean and slender form had gradually increased very considerably in weight and amplitude. She comes from a healthy family and never had been sick, never had a skin eruption.

The enormous size of her body, due to excessive fat development, is at once apparent. Acromegalic enlargements of the bones are entirely wanting. Urine free from albumen and sugar. Weight=135 Kg.; Wassermann negative; also, at a later period.

The eyes show a slight divergence (left eye). However, there is no paresis, the motility is free, diplopia has never been observed. The deviation is solely due to the considerable amblyopia in the left eye, as we see it often in cases of monocular macula corneæ, etc. The pupils react promptly and equally to light.

Ophthalmoscope: Both papillæ, but especially the left one, atrophic and pale. No signs of neuritis or papillitis. Vessels normal in the remaining parts of the fundus.

The visual field has an undoubted bitemporal hemianopsic character, especially the shape of the color restriction in the right eye. In the right temporal field for white, lying outside of the color fields, white is called gray. When this gray part was carefully delimited the hemianopsic character was still more pronounced. In the left eye there is only a small remnant of the field of the nasal half. No error of refraction. V. R.E.=0.1, not improved with glasses. L. E.=movements of the hand at 30 cm.

Diagnosis: Compression of the chiasm from below by posterior hypophysis tumor, hypophyseal adiposity with loss of sexual function.

Therapy: Hypophysis tablets (0.1 Merck) and, in order to produce quick absorption and to free the optic nerves, potassium iodide in small dosses, the highest 0.5 g. 3 times a day.

On May 18th, 1911, I sent the patient to Professor Naegeli for examination. He confirmed the diagnosis and found an enlarged thyreoid, no acromegalic symptoms. Furthermore, he found the facial and all other cerebral nerves, except the optic nerves, normal. He proposed a consultation with Professor

Sauerbruch concerning a possible operation. However, the patient could not be persuaded to consent to this, and the former therapy was continued.

In the further course of the disease a considerable, very slowly increasing, improvement of vision with marked enlargement of the field, was noticed. The general health improved and the weight was very considerably reduced.

On October 9th, V. R.E.=1.4; L.E.=0.24.

On November 12th *status idem.* Weight has gone down from 135 to 114 Kg.

The patient feels well again and willing to work, and is very agile. She does no longer come to the office and medication is stopped. Menstruation and libido sexualis have, however, never returned, probably on account of insufficently long treatment or advanced atrophy of the genitals. Seven months later, July 18th, 1912, the patient returned, having felt worse of late. Ophthalmoscopically everything is unchanged; vision, too, is the same in the R.E.; however, in the L.E. it has fallen to fingers at 30 cm. The field is still much better than before the treatment; it has almost lost the hemianopsic character. It was measured for white only, on account of lack of time. The weight has increased to 122 Kg.

I now tried hypophysis tablets alone without potassium iodide, in order to see whether this preparation really had an organotherapeutic effect. This was the case, for up to September 11th V. R.E. increased from 1.4 to 1.6; L.E. from fingers at 30 cm. to 1.5 m. The weight sank from 122 to 120 Kg. and she felt better. On April 6th, 1913, the condition was the same.

I had occasion to examine her again on January 26th, 1914. There was in the R.E. whitish discoloration of the papilla; L.E. pronounced atrophy, as before. V. R.E.=1.4; L.E.=fingers at 1.5 m. Pupils equal, reacting to light. The right field for white was almost normal, for colors a slight indentation upwards and temporally, a slight sign of quadrant hemianopsia; L., everything restricted, no longer hemianopsic, nasally and upwards the same indentation for colors and white, so that it seems as if there was a homogenous quadrant hemianopsia. Weight =118 Kg. (Another scale than the one used before.) A radiogram made by Dr. Suter in Zuerich showed a marked but not very far advanced enlargement of the sella turcica.

This case is certainly surprising, showing a great improvement not only locally concerning the vision and visual field, but also

generally as regards adipositas (weight) and general well feeling (headaches, etc.)—an improvement which was certainly not due to accident, but solely to the method of treatment. The cure seems permanent (observed for almost 3 years).

Vision in the R.E. increased in a few months from 0.1 to 1.6, that is sixteen times what it had been; L.E. from almost nothing (movements at 30 cm.) to the useful vision of one-quarter of normal and regaining of the macular field which had been lost. All this happened in a dangerous affection which hitherto could be influenced only by a quite risky operation.

While of less importance to the patient, we must consider as scientifically much more interesting the considerable decrease of the hypophyseal adipositas together with a generally increased well feeling. During the period of regular treatment, May to November, the body weight fell fully 42 pounds; when treatment was left off it again rose 16 pounds, but fell again 4 pounds under a rather irregular medication. This considerable decrease of the body weight must, in my opinion, be credited solely to the organotherapeutic effect of the hypophysis tablets. This is confirmed by the pronounced decrease in weight and improvement in vision when the hypophysis preparation alone was given, without potassium iodide. This opinion concerning the organotherapeutic effect seems to be further strengthened by Grueter's[3] case, who gave only small doses of potassium iodide and could not report an improvement in the adipositas and only a local improvement (vision, field and headaches). Of course, we cannot draw final conclusions from one single patient and there may be many cases in which every medication is ineffectual.

The favorable effect of hypophysis preparations on the dystrophia adiposo-genitalis, which is considered to be the consequence of hypopituitarism, can easily be understood, and the exhibition of such remedies is as imperatory and as justified as the exhibition of the respective organ preparation—often with brilliant results—when the thyreoid is wanting or its secretion inhibited. In my case the theoretical assumptions seem to have been verified by the practical results.

Another hypophyseal type of disease, the more frequent acromegaly, is caused by hyperpituitarism, which naturally cannot be improved by the further ingestion of hypophysis extracts, but would actually be made worse. It is, therefore, not astonishing that organotherapy has hitherto produced almost nothing but failures.

Experiences are still wanting regarding the influence of medicaments on further hypophyseal affections like gigantism and insufficance pluriglandulaire. The manifold connections between and effects of the different glands with inner secretion on each other, and to other organ systems, are not as yet sufficiently understood. Only when our knowledge of these hidden processes will have become clearer, an internal therapy will give us better hopes of success. At present one thing seems certain, that operative procedures cover altogether too much space.

Although Biedl[4] in 1910 reported on some good effects of hypophysis medication in excessive fat development and reduced fertility in Froelich's disease, and mentions Rothschild,[5] Axenfeld,[6] Delille[7] as supporters, there is a strange absence of further experiments in this direction in the more recent literature. Weiss (Gmuend)[8] reports a case favorably influenced by organotherapy. Simmonds[9] reports decrease of diuresis by means of hypophysis extract in diabetes insipidus caused by hypophysis tumor. Similar observations are by Farnis, v.d. Veldens and Roemers.

Only recently Boer[10] (in the Oct., 1913, number of this Journal) reports three very interesting cases of this kind and says:

"As regards the therapy of affections of the hypophysis and the region of the hypophysis, really surgical interference is the only thing. Organotherapy with hypophysis substance is always unsuccessful in acromegaly, a favorable influence on the dystrophia adiposo-genitalis has sometimes been reported."

This citation certainly justifies the report of cases which have run a very favorable course under organotherapy.

I should have expected, too, that especially in the aftertreatment of successfully operated cases, in which we certainly must expect hypopituitarism, extract of this gland would be more often prescribed, and from reading the numerous case histories I have come to the conviction that many a more or less successfully operated patient could have been further materially improved by organotherapy.

Kanavel[11] alone reports on the very favorable effect of the aftertreatment with hypophysis extracts after a successful infranasal operation of a hypophysis cyst. The patient lost the adipositas, became spirited and fills a responsible position.

In a case of Turney's[12] the organ preparation was injected subcutaneously. On account of necrosis of the skin this had to be discontinued. The ingestion per os in the shape of tablets is certainly much more to be recommended.

Some authors have obtained marked successes with thyreoidin instead of hypophysis extract in cases of hypophyseal adipositas. It seems that Uhthoff[13] was the first to use this in such a case, because no thyreoid could be found and he assumed a vicariating enlargement of the hypophysis. The effect was very satisfactory, since the adipositas disappeared and the mental faculties were improved.

DeSchweinitz,[14] too, reports on good results from thyreoidin in two cases of hypophysis disease. He combined with this mercurial inunctions, probably in order to hasten absorption. Grueter (l.c.) had to discontinue the thyreoidin after fourteen days, because the patient could not bear it.

We may well assume that these authors were prompted in the use of this remedy by the favorable result in Uhthoff's case.

It seems, however, that a decided curative effect from thyreoidin can be expected in these cases, only when as in Uhthoff's the thyreoid participates more or less in the disease; this, however, as far as I am aware does not belong to the Froehlich type of hypophysis disease. Thyreoidin, by Baumann called iodothyrin, consists mainly of iodine bound to an albumenoid body. I believe that, at least in de Schweinitz's cases, who gave large doses of thyreoidin, probably the mineral iodine alone and not the specific thyreoidal components of the preparation have acted in the favorable way. This opinion is decidedly supported by Gruetner's case in which iodide of potash was the exclusive medication and led to a good result. Axenfeld (by letter), also, saw a surprisingly excellent, but transitory, effect from large doses of iodine in an elderly lady. I do not hesitate, in my case, to attribute a prominent part of the excellent effect to the iodide of potassium in conjunction with the hypophyseal extract. I may state here that I have used this long before Gruetner. The present experiences do not yet suffice to explain the mode of action. Two thoughts influenced me in the use of potassium iodide. In the first place the aid to the absorption in the quickest possible time in order to reduce in size the hypophyseal tumor, thought, and by the result proven, to be benign; to quickly relieve the pressure on the endangered and already atrophying optic nerves and thus to improve vision which had already fallen off to a considerable degree.

In the second place, the following reasoning actuated me in selecting this remedy. I did not doubt that in my case I had to deal with a benign, very slowly progressing enlargement of the

hypophysis, a gland with inner secretion. I compared this with another, much better known gland, the thyreoid, the simple struma, the benign enlargement so very frequently found in Switzerland which is so quickly removed by the use of iodine, potassium iodide and other iodine preparations. In view of the successes of Uhthoff and de Schweinitz with thyreoidin I was prompted to see, whether or not an enlargement of the hypophysis might be favorably influenced by iodine preparations together with organotherapy. I knew, of course, that the two organs are not the same as regards function and secretion. However, the normal hypophysis has been found by the examinations made by Ewald and Schnitzler[15] to contain iodine and even, as it seems, some thyreoidin. Biedl thinks that the chemical examination of this gland is still insufficient.

Just as little as at present kachexia strumipriva and myxædema, etc., can be cured for life by the transplantation of thyreoids, can we expect by transplantation of the hypophysis to gain lasting successes in hypopituitarism, especially, since Paulesco[16] has shown by experiment that pieces of hypophysis implanted in dogs are perfectly absorbed in from 2 to 3 months. The organ preparations, the effect of which is proven, are much easier to take, more certain and easier of dosage and are well borne by most patients, but, of course, their ingestion must be continued for a long time, perhaps, always in order to secure a lasting success. Only when these are not borne, may a transplantation be tried.

I can be brief regarding the diagnosis and differential diagnosis in this case. This is a pure, typical case, proven by Roentgen ray examination, of dystrophia adiposo-genitalis of the Froehlich syndrom, the separate symptoms of which are clear and free from doubt in our patient whose disease had already progressed very far when she came for treatment. The first sign, which is usually observed the earliest, the cessation of menstruation had been observed ten years previously; the slowly progressing atrophy was followed by the loss of the libido and sterility. The gradually growing tumor of the hypophysis caused continuous headaches, as most patients complain of, and pressure on the chiasma as shown by the optic nerve atrophy, which was quite far progressed in the left and beginning in the right eye. Due to the compression there was very poor vision and the bitemporal hemianopsic type of the visual field, especially for colors. Prominent, indeed, in our case were the influences on growth,

aside from the sexual changes, the most important symptom of disease of the hypophysis. The lady who was slender and thin when she was married has, though still young, reached a weight of 270 pounds. There was, therefore, nothing atypical in this case.

In the absence of the Wassermann reaction, although repeatedly tested, and any luetic symptoms nobody will, in view of the apparently favorable effect of small doses of iodide of potassium in Gruetner's, even less in my case, allow *ex juvantibus* a suspicion to arise of the presence of lues. In the same manner one ignorant of the glands with inner secretion might call the many thousand cases of struma of the thyreoid luetic because iodide of potassium cures them promptly, or the innumerable cases of phlyctænules which heal promptly on the application of the yellow mercury ointment. Aside from this, both Grueter's and my case were examined by prominent internists. Anyhow the doses of potassium iodide would be much too small to exert any influence on a severe gummatous tertiary lues at the base of the brain, which would have to be assumed. Mercurial and arsenial preparations have never been used in these two cases.

We must not forget that, as stated before, the hypophysis, too, contains iodine which when, in consequence of disease of the organ, it is lacking has to be replaced from without, perhaps in a similar although quantitatively different manner as with the thyreoid.

In our case nothing is known concerning the localization of the tumor within the limits of the hypophysis. It is generally assumed that the posterior nervous part of the gland, or its stem, is affected in dystrophia adiposo-genitalis. The stem is by many authors looked upon as an excretory duct the compression or destruction of which could alone produce hypopituitarism.

Kocher's remark concerning the thyreoid that struma and struma are two different things, applies also to benign tumors of the hypophysis. In one case the tumor may be due to an increase in the specific functionating tissue, in the other case the whole gland has in the beginning been affected by degenerative processes which destroy the function. In the first case an increased, in the second case a decreased, secretion or its abolition will follow. Only the second group is likely to offer hopes of a cure by means of organotherapy supported by medicaments.

There are two points of importance for the practitioner. First that in these compression atrophies the visual field shows a hem-

ianopsic character for colors very early and for a long time, while the outlines for white are only irregularly restricted or normal. Second, that such compression atrophies, even if the papilla is white and vision has fallen to seeing of hand movements, are capable of considerable restitution and improvement to useful acuity. We must, therefore, not make an immediate bad diagnosis in hypophysis tumors as regards vision, as Fleischer[17] recently did for cases in which vision had begun to fail. To point out this fact is the duty of the practitioner, so as not to give up and surrender to their fate at once apparently desperate cases. This is the same for whatever therapeutic action is taken, operation or organotherapy. The surgeons, too, report considerable improvement in vision, even when it was much reduced before the operation. Von Szily, also, reports marked improvement of vision after operation in his second case.

It is characteristic of organotherapy that the preparations must be taken for a long period, if not for life, to establish a lasting cure. This is shown in the analogous cases in which thyreoidin is prescribed which removes the symptoms of lack of thyreoidal secretion with surprising rapidity; but as soon as it is stopped, the well-known symptoms promptly return.

As stated, my recommendation of organotherapy with small doses of potassium iodide refers at present exclusively to those forms of benign hypophysis diseases in which physiologically a replacing of the lost organ substance is inoperative, that is cases of hypopituitarism, which as it seems, causes the dystrophia adiposo-genitalis and, perhaps, in part the insufficance pluriglandulaire. I should like to recommend to all those experimenting with this therapy to make an exact control of the effect and to watch the case carefully, for organ preparations are not innocuous medicaments and in non-success no valuable time for an eventual operation should be lost. I should warn against them directly in cases of acromegaly, in which I and others have seen bad effects from their use; these, however, speak for the effectiveness of the extracts and incite experiments in the opposite group that of hypopituitarism. A trial with iodine preparations may be recommended in acromegaly, too.

In cases of hypophysis diseases we must be led in our therapeutic efforts by the same rules which are in general followed in the treatment of struma of the thyreoid. Only those tumors must be handed over to the surgeon which refuse to react favorable to a previously tried medicamentous therapy.

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## THE ÆTIOLOGY OF TRACHOMA.

By Professor Th. Axenfeld,

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(Translated by A. Alt, M.D.)

(The following are the conclusions arrived at by Axenfeld after a most careful study of the ætiology of trachoma which is published in book form (see review). This most recent publication of so eminent an authority cannot fail to interest our readers.)

It is certain that microorganizations of the group of bacteria are not the cause of trachoma, not even in those "disposed;" neither are blastomycetes.

The known conjunctivitis incitors may complicate and influence trachoma, but never produce it.

There are germs which are exclusively pathogenous for the eye.

The beginning of trachoma is relatively seldom "acute" in the full sense of the word. The frequency of the acute beginning in experimental transmission on the conjunctiva of man and ape is due to the massive inoculation into the mucous membrane so

different from the natural transmission. If the virus of the Provaczek bodies should be a mixed infection added to the trachoma, an "acute" beginning might possible be referred to them.

Pure, bacteria free trachoma, can be transmitted, but is not necessarily contagious with simple transference of the secretion.

In cases of positive transmission in man when the infection acted pathogenously, the formation of granules always took place. A "follicle" free trachoma in man is thus far unproven (unless the transmission of inclusion blennorrhœa is taken into acount).

Undoubted proofs of a decided disposing influence of race and climate are wanting.

Personal liability is varying, but here, too, the judgment is difficult since we have thus far no measure for the infectiosity and contagiosity of the transmitted material. For, trachoma is not equally transmissible in all stages.

It is uncertain whether there is an acquired immunity and to what extent after a cure of trachoma. If there is, it is probably only relative and limited in time.

Cases of onesided trachoma do not necessarily prove one-sided immunity. Yet, a relative immunity of this kind cannot be excluded. The outlook for artificial immunity is at present dim.

It seems that the trachoma virus offers little resistance to heat, cold and drying; yet, exact values in this point are as yet unknown, since the varying effect of inoculation in apes renders judgment difficult.

We cannot only not always differentiate between abortive and beginning trachoma and other follicle formations, but even the full picture of granular trachoma includes (if there are no scars and pannus) benign infections, which have not come from trachomatous conjunctivæ.

What we diagnosticate purely clinically and in the smear as granular trachoma, if it is not complicated with pannus, can not longer be looked upon as a unit of infection, unless the inclusion blennorrhœas with their transmissions are counted with the trachoma.

The really genital inclusion virus, the inclusion blennorrhœa of the newly born, may produce a full trachomatous picture, although this is not always the case. Serious scar formation and pannus, according to our present knowledge, are not produced by

this virus, the course of this granular affection has always been a benign one.

Even in the same species the conjunctiva of the ape does not react uniformly; the result is often negative, only in a portion of the cases real follicle formation, and exceptionally scar formation, results.

Transmissions of the filtrate of trachoma material, as also of inclusion blennorrhœa have been successful. These two are thus far the only affections which produce a filtrable pathogenic material for the conjunctiva; they are, also, the only ones from which a transmission to the ape was possible.

Since inoculation in the ape of trachoma and inclusion blennorrhœa can give the same results, it is the question whether the positive inoculation with trachoma filtrate is not due to the simultaneous presence of inclusion virus and not to the trachoma itself. A positive inoculation with trachoma filtrate free from inclusion would be of great importance.

The Prowaczek bodies, especially those reaching the limits of visibility, the elementary bodies, may be filtrable although being of a parasitic nature.

The discovery of the Prowaczek-Halberstaedter bodies is of great importance in the trachoma problem, especially their being found in the newly born and in the genitals.

The form and staining quality of the Prowaczek bodies ("P. K.") show certain variations.

They are of greater frequency alone in trachoma and the "inclusion conjunctivitis" of the newly born, as in transmissions of these and genital diseases.

Occasional findings in the normal conjunctiva and with other conjunctival affections are certainly rare and probably not always exactly diagnosed; they need not argue with certainty against the ætiological importance of the P. K. For the well-known bacterial conjunctivitis incitors may occasionally be found in the norm, and there might be atypical cases.

Statements as to a high frequency of P. K. even in simple conjunctivitis arouse doubts as to the technique and diagnosis.

In what relation the epitheliosis desquamativa, also described as an inclusion affection and the swimming pool conjunctivitis stand to trachoma, will still have to be found out.

The findings of P. K. so far are limited to the conjunctival epithelium. The findings in the corneal epithelium and the lacrimal sack call for further control examinations.

Thus far it has been impossible to find P. K. or parts of them in the interior of follicles.

Morphologically the P. K. in trachoma and those in inclusion blennorrhœa are alike. Attempts to make out morphological differences have been futile. This does not prove that they are the same biologically.

The course of development of the P. K. described by Halberstadter-Prowaczek and Lindner seems convincing, whether we have to deal with parasites or cell derivates. The names of "initial bodies" and of "elementary bodies" help the understanding.

It is not correct that inclusions are found only in cells which have been previously altered. Small inclusions lie often in normal cells. At first there is a certain tolerance between cells and inclusion; as the inclusion increases the cell begins to degenerate. The histological findings do not demand that the immigration of P. K. is purely secondary and ætiologically unimportant, but can well be brought in unison with an exciting role of the P. K.

Epithelial cells with inclusion are found in all the layers of epithelium and can best be studied in sections. In future sections should be much more made use of, especially for comparative histological studies. The morphological differences between P. K. in smears and in sections are due to the different modes of fixation.

Concerning granules in the free secretion outside of the epithelia we should be very wary. Here, however, Lindner's "free initial bodies" must be noted. Their presence is characteristic of inclusion affections and must in future never be neglected in studies on the ætiology of trachoma.

Bodies of the shape of free initial bodies are now and then found also within epithelial inclusions. They are important for we believe that P. K. are living bodies. Yet, we cannot assume that the free initial bodies alone can be transmitted.

It would be very important to know in how far the P. K. are cell derivates. Yet, they differ from known cell products. This, of course, would not render their cellular origin impossible.

In smears we must also consider artefacts, but the P. K. are certainly not simply artefacts.

We have to think, also, of secretions and alterations of the epithelial nucleus. Yet, it would be rather difficult to explain the different forms of P. K. in this manner. Similar derivates might come from the protoplasm. The "apparatus of Golzi-

Klopsch" is not the base for P. K. That they are not a mucoid secretion is proven by the absence of the characteristic staining qualities, as also by their morphology.

Their microscopic behavior, their transmissibility and their presence in certain inflammations only, speak for their parasitic nature.

Culture experiments have so far not furnished certain proof that they are the incitors of trachoma.

If the P. K. are parasitic bodies we can assume that the "elementary bodies" can transmit the infection, as well as the "initial bodies." The filtrability points that way.

It is not probable that the P. K. are living bodies without pathogenous importance like certain accompanying bacteria. The P. K. do not originate from gonococci or any other known bacteria.

If the P. K. are living bodies, and this is most probable, they cannot be identical in trachoma and inclusion blennorrhœa or produce a different effect in spite of the same morphology. If they are identical, they may be the trachoma incitors or we have to deal with a mixed infection.

For this latter view, there are various grounds; but Lindner's opinion of their identity has as yet not been sufficiently refuted.

The P. K. are not exclusively found in trachoma (or inclusion blennorrhœa) and are therefore not "specific".

Yet their presence in other conjunctival affections is so rare, that finding them in cases suspicious of trachoma is of a certain importance and makes the diagnosis more probable if not absolutely secure against other follicular affections. Their absence, however, does not exclude trachoma.

There are important facts which speak against the fact that the P. K. are the incitors of trachoma, especially the inconstancy with which even in progressive stages of the disease, they are found in exacerbations only. A weightier point is that also in recent and untreated secreting cases they are in reality often found, yet not regularly so, and that in positive cases they often disappear rapidly, especially after the application of silver nitrate, although the disease progresses. Furthermore, trachoma can be transmitted to apes although no P. K. may appear in their epithelia.

In spite of this we cannot consider as absolutely disproven the possibility that parasites contained in the P. K. are the trachoma incitors. It seems going too far at present in case the P. K. are

not found in the smear to conclude the virus contained in them is altogether absent and not to be considered ætiologically. Not only because their nestlike arrangement makes it possible that P. K. are not found in every specimen, but it may well be that the P. K. are only one form of these "parasites" and that there are other forms less typical in arrangement and shape which cannot be found in the smear. For this speaks the fact that in cases of positive inoculation during the days of incubation P. K. cannot be found, but appear later; as, also, Heymann's experiment, who secured successful inoculations with inclusions in the ape by using genital secretions which were free from inclusions.

Finally the parasites might no longer be present in the epithelial cells but have in an invisible form entered into the tissue (the follicle, for instance) from which they could not be taken by an epithelial smear.

The inclusion conjunctivitis of the newly born is a frequent affection and found all over the world. Careful examination series are, however, still wanting. It is as a rule much easier to find P. K. in inclusion blennorrhœa than in trachoma on account of the larger number of inclusions. Here, too, they are of prognostic and diagnostic importance and interest. For the complete examination of an inflammation of the newly born a smear with Giemsa stain is as necessary as one with the Gram stain.

A careful training for Giemsa staining belongs to ophthalmological education.

Form and stain of the different components of the P. K. vary in certain ways.

The virus of inclusion blennorrhœa resists silver nitrate more strongly than the gonococci and, therefore, submits less to the Crédé method.

It seems to be proven much more certainly that the P. K. are the incitors of the blennorrhœa of the newly born and its transmission, than that they are the incitors of trachoma. For in inclusion blennorrhœa they are found much more regularly, and their persistance and number correspond more to the clinical course than in trachoma; they can more certainly and constantly be transmitted to the ape, resulting in a picture which agrees with the inclusion blennorrhœa.

Based on the "parasitic" character the assumption lies near that P. K. are the ætiologic factor of a special conjunctival affection which is not associated with pannus and but exceptionally, with scar formation, leads often to the formation of folli-

cles and is clinically similar to trachoma with a recent inflammation, or to the papillary stage of gono-blennorrhœa, and moreover frequently accompanies the last two infectious diseases. The presence of the P. K. in trachoma would, according to this opinion, argue for a mixed infection.

Thus far no one has succeeded in making it appear probable that the frequent beginning of trachoma in early youth (in countries pervaded with trachoma) has any connection with the genital infection of the newly born.

It is very desirable that dermatologists, urologists and gynæcologists should pay considerably more attention and study to the "inclusion virus" in their departments.

It is doubtless that, without connection with any trachomatous material from the genitals, a picture can be produced in the conjunctiva which cannot always be distinguished from the granular trachoma which is transmitted from conjunctiva to conjunctiva. Thus numerous cases originate which from their clinical picture we call trachoma; but their course is benign.

Where trachoma with its complications is endemic, it has been brought there, according to our present knowledge as trachoma, and is transmitted further as trachoma. It has never been proven that from the genitals or from an inclusion blennorrhœa the endemic trachoma with pannus and serious scar formation has ever arisen, and from the results of inoculation it is not probable.

The findings of protozoa by Czaplewski cannot withstand criticism and they are really due to the misunderstanding of cell degenerations. The cellular findings of Junius are also without any ætiological value.

At present the further study of the Prowaczek-Halberstaedter bodies is the most promising task of the trachoma problem. This must be done in a critical manner and under the control of the pathological anatomist and the zoologist.

We not only owe to their discovery an unthought of widening of our knowledge, but we may, also hope for further progress and, perhaps, for the solution of this problem from a further study of all points in connection with it.

The practical hygienic clinical defense and combat against the endemic trachoma remain the same as heretofore. There is no reason to change our measures in this direction.

# ABSTRACTS FROM MEDICAL LITERATURE.

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## OPTIC NEURITIS AND MYELITIS.

Charles Goulden (*Trans. Ophth. Soc. U. K.*, Vol. XXXIV, p. 229) contributes a full and interesting paper on this subject. Various names have been given the condition by different authors; at times described as "Neuromyélite Optique Aiguë", also as "Ophthalmoneuromyélite" and "an acute paraplegia associated with bilateral blindness." Fifty-two cases have been published, Goulden's being the fifty-second. Gordon Holmes, in discussing Goulden's paper, stated that he had seen two cases of this condition neither of which had been yet published. The symptomatology as given by Goulden is as follows: "In these cases it is extremely rare for the optic neuritis and myelitis to appear simultaneously. Most commonly the optic neuritis is the first to appear in about four fifths of the cases. Usually one eye is first affected, to be followed by the other at some time varying from a few hours to several weeks, both preceding any signs of myelitis. Blindness is usually present in both eyes at the same time, although one eye may have recovered some sight before the other is affected. It may happen that the myelitis appears after the first eye has become affected, but before the second becomes blind. The interval between the affection of the eyes and the appearance of the myelitis may be as long as two months. The usual period is a few days; in the case here reported it was six days. If the patient live sufficiently long, after an interval of a few days to two weeks, the sight begins to return, and ultimately a considerable amount of vision is restored. But it may happen that the myelitis, especially in cases of rapidly ascending myelitis, causes the death of the patient before the stage of retrogression has had time to appear." The optic nerve involvement may show itself as (1) a true optic neuritis, or (2) retrobulbar neuritis. In the true neuritis type the patient first complains of seeing as through a cloud. There is no pain on moving the eyes. The pupils are widely dilated and either do not react to light or react very imperfectly. The appearance of the disc varies according to the intensity of the inflammatory process. Rarely retrobulbar neuritis occurs and when it does there

is severe frontal headache and pain upon moving the eyes; the eyes are usually very tender upon pressure. There may be defects in the field, hemianopia, central color scotoma and loss of sectors of the field. There is complete loss of the pupillary reflex. The ophthalmoscope shows little abnormal. The onset of the myelitis is insidious. The legs become tired, weakness increases until the patient takes to bed. Paralysis becomes complete with incontinence of fæces and urine. The reflexes are usually completely lost as is also the muscle sense, and trophic disturbances are very common. Goulden gives the macro- and microscopical findings of brain cord and optic nerves. The various ideas concerning the ætiology are given. Up to the present no common cause has been discovered which will apply to the majority of cases. Syphilis is frequently mentioned as a possible cause. Shock, worry, exertion, cold, the results of an immersion, influenza, long gazing at an eclipse of the sun, sore throat, complicated miscarriage, recent childbirth and severe oral sepsis are mentioned, also, as possible causes. Half the patients die mostly from septic absorption from bedsores or bronchopneumonia. People of all ages are affected, males more frequently than females. Goulden concludes with the following summary: (1) There is a rare condition named by Devic "neuromyélite optique aigué" in which myelitis, acute or subacute, is associated with optic neuritis, acute or subacute, the acute neuritis accompanying acute myelitis, the subacute myelitis accompanying the subacute optic neuritis.

(2) Usually the optic neuritis (usually papillitis and more rarely retrobulbar) precedes the myelitis. It is very rare for the neuritis and myelitis to appear simultaneously.

(3) There is a tendency for both the optic neuritis and myelitis to end in improvement, but complete recovery is very rare, especially in acute cases.

(4) Pathological examination shows that the lesions in the cord may be very diffuse and extensive, but yet they may be confined to one part of the spinal cord, and that part may be the lumbar enlargement.

(5) The lesions in the optic nerves are most marked anterior to the chiasma, but may extend throughout the optic tracts.

(6) The lesions are produced by some common agent acting on both spinal cord and optic nerves. This agent acts directly upon the nervous structures, especially on the white matter, and not by way of the meninges. Most likely it is an infective agent.

## THE CONVERGENCE INDEX AS A MEASURE OF THE CONVERGING POWER.

Alexander Duane (*Archiv. of Ophth.*, September, 1914) states that there are two methods of determining the converging power, in general use, one being the ability to overcome prisms base out, and the other in determining the convergence near-point. Prism convergence is styled but an approximate indication of the real converging power. The ability to overcome prisms base out varies greatly and represents knack or aptitude in the performing of an unaccustomed act. The determination of the convergence near point is the most reliable means of estimating the actual converging power. It should properly be measured from the base line connecting the centers of rotation of the two eyes, which is usually 25 mm. behind the glasses of the patient or a carefully adjusted spectacle frame. The apex of a millimetre rule is placed against the point where the reference plane crosses the nose and the rule itself is held perpendicular to the plane, so as to lie in the mid-line. The test object carried along this rule may be a minute dot on a card, the white head of a pin and, better still, especially where vertical deviation occurs, the dot is replaced by a vertical line. As a measure of converging power Duane proposes a ratio or "convergence index" (Ci), represented as follows:

$$\text{Ci}=\frac{\frac{1}{2}\text{ interpupillary distance}\times 100}{\text{PcB (The convergence distance)}}$$

This index usually ranges from 35 to 50. An index below 35 means low converging power, and one below 30 indicates actual convergence insufficiency. The index at times is as high as 63. Duane emphasizes the following statement: "For all values of the converging power ordinarily met with, both in normal and abnormal cases, the actual converging power in degrees equals the convergence index plus 3°." To illustrate, consider a patient with a Pd. of 60 mm. and a convergence distance (PcB) of 75 mm., then the convergence index (Ci)$=\frac{30\times 100}{75}=40, +3°=43°$, the actual degree of convergence.

The errors in applying the rule are practically negligible. Duane concludes by saying that the convergence index is not only a true measure of the converging power, but gives also in all cases a sufficiently accurate notion of the utility of this converging power for the patient, i.e., of its availability in enabling him to look at near objects.

## THE AFTERMATH OF SCLERECTOMY.

An editorial in the *British Medical Journal,* October 3rd, 1914, has the following to say under the above heading:

"During the past five years there has been a veritable furore for the operation of sclerectomy or sclerotomy for the relief of glaucoma. Herbert introduced sclerotomy and Lagrange sclerectomy. Lagrange's method was modified by Freeland Fergus, who used a trephine, and again by Elliot, who improved the combined sclerostocyclodialysis advocated by the Glasgow surgeon. Elliot, by his enthusiasm and his vast command of material, has done more than any other ophthalmologist to popularize the operation which is now often called the Elliot operation. Holth of Christiania used a punch instead of a trephine, obtaining a similar result in a different way. The fact that a second edition of Elliot's book on sclero-corneal trephining has appeared within a year after the first, is proof of the great interest taken in the newer operations for glaucoma. At the present time some form of sclerostomy is being performed by the majority of ophthalmic surgeons all over the world, and Elliot himself has published statistics of over 1,000 cases of trephining.

"Yet no definite pronouncement upon the question can yet be made. Certain basal facts may be said to have crystallized out. It is pretty generally admitted that sclerectomy is better than sclerotomy. The majority of surgeons are trephining, or punching, or performing the Lagrange operations, though Herbert's operations are performed by some. It would appear that, provided a piece of sclera be removed, whether by trephine, punch or scissors, the ultimate result is the same. But—and this is the most important fact of all—though the newer operations were introduced because they were safer and more satisfactory than iridectomy, yet to-day most surgeons add a supplementary iridectomy. In other words, the new operation is more serious than iridectomy, because it is iridectomy and something more. If, therefore, sclerostomy is to supersede simple iridectomy in all cases, as Elliot would wish, it must be proved beyond doubt that the final results obtained by the new operation are decidedly better than the old.

"At the Oxford Ophthalmological Congress last July, a paper was read by Jameson Evans and T. Harrison Butler upon the results of their glaucoma operations during the past seven years. They stated that they were astonished to find when they came to make up their statistics that iridectomy headed the list as the

most successful operation. Each of these surgeons came to this conclusion independently. In this paper only 160 cases were summarized, and a larger number is necessary before passing final judgment. In the discussion which followed the paper, several speakers narrated cases of late infection. The operation had been a success for months or even years, then destructive iridocyclitis set in or panophthalmitis developed. One speaker described a case of sympathetic ophthalmitis which had followed one of his trephining operations. Several cases of late infection have been published in Germany and elsewhere; and at the Aberdeen meeting of the British Medical Association, Mr. Hall Griffith, of Manchester, recounted a melancholy example, and mentioned that thirty instances of this complication were on record. Several others were added to the list by the speakers who discussed the paper. It is therefore obvious that every patient who has a filtering scar runs a risk of losing his eye from septic infection, and a slight one of losing the second as well from sympathetic ophthalmitis. There are other complications met with, one of which is delayed reformation of the anterior chamber, which may remain empty for a fortnight. In other cases permanent shallowness of the chamber has been noted. Dislocation of the lens may follow trephining, and post-operative iritis is said by Elliot to be common.

"We have said enough to indicate that the claims made for sclerostomy cannot be admitted without question. The newer operations are valuable in many cases of glaucoma, but it would appear that they will not entirely displace simple iridectomy. It will be the work of the next decade to decide which cases are most suitable for fistulization and which should be reserved for iridectomy. We advise our readers who contemplate performing sclerectomy to study Col. Elliot's book, but to remember that it is the work of an enthusiast."

## CONCERNING THE USE OF INVISIBLE BIFOCALS IN THE TREATMENT OF CONVERGENT STRABISMUS IN LITTLE CHILDREN.

Wendell Reber (*Ophthalmic Record,* December, 1914), arguing from the fact that good results in high esophoria were frequently obtained by adding one to three diopters of a plus sphere to the distance correction to be used in near work, came to the conclusion that it might be of service to try the same procedure

in functional strabismus of children. He states that all will admit the following postulates:

1. That a certain percentage of all esotropes under seven years of age lose their convergent strabismus under the influence of a correct refraction, conforming to Donders' "accommodative strabismus."

2. That a certain percentage of other esotropic cases are practically emmetropic or even myopic and therefore not explainable on the basis of Donders' theory.

3. A certain percentage of young esotropes exhibit congenital paresis or palsy of one or more of the extra ocular muscles resulting in the usual clinical pictures of esotropia. These are often overlooked.

4. A very small percentage of young esotropes are the subjects of faults either in the development or insertions of the extra-ocular muscles leading to the clinical picture of strabismus convergens.

5. A certain small percentage of young esoptropes are the subject of fine ultra-ophthalmoscopic changes in the retina or optic nerve of one eye, causing esotropia.

Classes 1 and 2 are examples of functional esotropia, whereas 3, 4 and 5 are amenable to operation only.

Functional strabismus arrays itself in three classes: (a) Pure accommodative strabismus, (b) pure afusional strabismus, and (c) a combination of (a) and (b) which Reber states is by far the most common type.

Reber proposed to correct the vicious state of the accommodative apparatus of functional esotropes by the wearing of bifocals. They were made invisible because of the desire to obviate conspicuousness and outside comment. The two cases first tried were in the nature of an experiment. The results were so gratifying that other children were given bifocals. The idea is to set the spastic accommodative apparatus at rest by adding anywhere from plus one to plus three to the distance correction so as to suppress accommodative overactivity in near work. One-half per cent. atropine solution once a day for two months is used with the invisible bifocal; the atropine is withdrawn at the end of this time.

Other methods are not neglected; fusion training is carried out. Small toys, blocks and letters are interdicted up to the fifth year. Reber mentions one objection to the use of the invisible bifocals in very young esotropes, which is that the patients begin to dodge the bifocal segment and for the first week or two bob

their heads about a good deal. However, they soon learn to adjust themselves to the new conditions. Eleven cases have been tried out, which Reber states are far too few upon which to base any working conclusions. The hope is expressed that by this procedure many children will escape operation and be given full binocular vision. Credit is given Dr. Linn Emerson for having previously advocated the same idea.

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## BOOK REVIEWS.

DIE AETIOLOGIE DES TRACHOMS. (The ætiology of trachoma.) By Professor Th. Axenfeld, with six lithographic plates. Jena, 1914: Gustav Fischer. Price 10 marks.

This comprehensive monograph was prepared for the VII international ophthalmological congress which was to have been held in St. Petersburg last summer. It is a timely and thorough study of all that is known at present regarding the ætiology of this widespread disease, to which the author has added the results of his own experiments and pathological studies. The results of these our readers may find in this number of THE AMERICAN JOURNAL OF OPHTHALMOLOGY, page 367.

Like all the previous works of this eminent author, this one is to be recommended to our readers in the warmest manner. Its clearness and thoroughness are highly to be admired. The colored illustrations are excellent.

LEHRBUCH DER AUGENHEILKUNDE. (Textbook on Ophthalmology.) Edited by Professor Th. Axenfeld. Fourth edition, with 12 lithographic plates, three color print plates in the text and 584 test illustrations. Jena, 1914: Gustav Fischer. Price 15.50 marks.

It is barely six years since we had the pleasure of introducing to our readers the first edition of this most admirable text-book on ophthalmology, written by Axenfeld and eleven other prominent ophthalmologists. In our opinion it easily takes the foremost rank in the large and constantly enlarging number of textbooks on ophthalmology. This new edition is further enriched by the addition of most recent experiences and some new chapters. The illustrations are of the best. ALT.